

Recent Trends in the Growth Rate of Atmospheric Carbon Dioxide

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Every single year since the start of direct measurements of atmospheric carbon dioxide at the Mauna Loa Observatory in 1958 the concentration has increased (Figure 1). The rate of increase has accelerated from the early 1960s to the present. The decadal rate of increase appears to be accelerating again after a period of low growth in the first half of the 1990s. The CO₂ record exhibits a striking correlation with global temperature variations, but the correlation loses strength on longer time scales. We attribute quantitatively the changes in the CO₂ growth rate to the changing global emissions from fossil fuel burning and to temperature anomalies and trends.

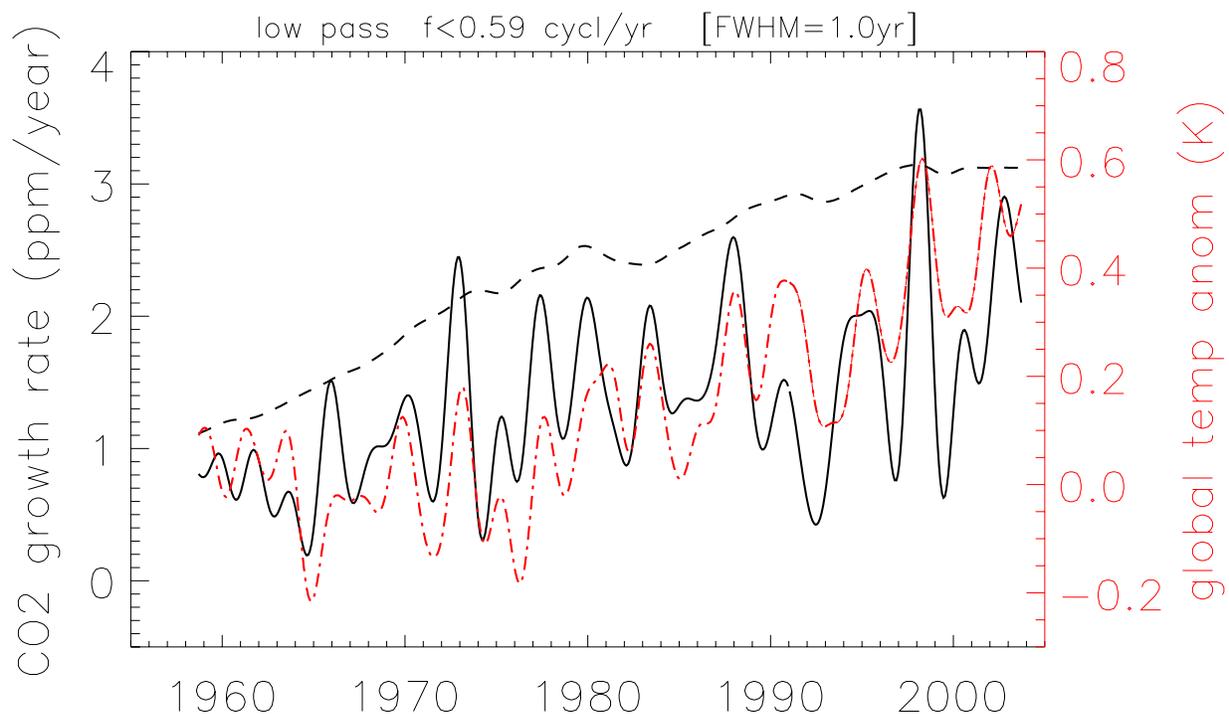


Figure 1. The de-seasonalized CO₂ growth rate as observed at the Mauna Loa Observatory (solid line). The rate of global CO₂ emissions from the burning of fossil fuels is plotted as the rate at which the atmosphere would increase if everything remained in the atmosphere (dashed line). The NASA Goddard Institute for Space Studies (GISS) global mean atmospheric temperature index (oceans and land) is plotted as differences from the 1951-1980 average (dash-dotted line). All curves were filtered with smoother with full-width at half-maximum (FWHM) of 1 year.